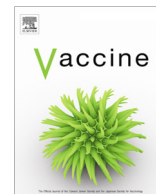




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## Review

## Strategies for increasing uptake of vaccination in pregnancy in high-income countries: A systematic review

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## ABSTRACT

**Introduction:** Vaccination in pregnancy is an effective method to protect against disease for the pregnant woman, foetus and new born infant. In England, it is recommended that pregnant women are vaccinated against pertussis and influenza. Improvement in the uptake of both pertussis and influenza vaccination among pregnant women is needed to prevent morbidity and mortality for both the pregnant women and unborn child.

**Aim:** To identify effective strategies in increasing the uptake of vaccination in pregnancy in high-income countries and to make recommendations for England.

**Methods:** A systematic review of peer reviewed literature was conducted using a keyword search strategy applied across six databases (Medline, Embase, PsychInfo, PubMed, CINAHL and Web of Science). Articles were screened against an inclusion and exclusion criteria and papers included within the review were quality assessed.

**Results and conclusions:** Twenty-two articles were included in the review. The majority of the papers included were conducted in the USA and looked at strategies to increase influenza vaccination in pregnancy. There is limited high quality evidence for strategies in high-income countries to increase coverage of pertussis and influenza vaccination in pregnancy. A number of strategies have been found to be effective; reminders about vaccination on antenatal healthcare records, midwives providing vaccination, and education and information provision for healthcare staff and patients. Future interventions to increase vaccination in pregnancy should be evaluated to ensure efficacy and to contribute to the evidence base.

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**Abbreviations:** EPHPP, Effective Public Health Practice Project; GP, General Practitioner; NHS, National Health Service; PHE, Public Health England; PRISMA, Preferred Reporting Items for Systematic Reviews and Meta-Analyses; RCT, Randomised Control Trials; WHO, World Health Organization.

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## 1. Introduction

Vaccination in pregnancy protects the pregnant woman, foetus and new born infant from harmful diseases [1–4]. For high-income countries, World Health Organization (WHO) [5] recommends pregnant women are vaccinated against influenza and pertussis. In England, influenza vaccination in pregnancy has been offered since 2010 [6]. In April 2012, a pertussis outbreak occurred in England with 9300 confirmed cases of pertussis and the death of 14 infants under three months old [7]. This prompted the Department of Health (DH) to offer the pertussis vaccine to all pregnant women from October 2012 to protect babies who are too young to be immunised [8]. The pertussis vaccination in pregnancy has been found to be 90 per cent effective at protecting infants in the first months after birth [9], safe to mother and foetus [2,10] and is recommended by WHO [11] to prevent premature infant mortality. The vaccination is offered from 16 to 32 weeks gestation [6], and is also available up until delivery but does not offer the same level of protection to the infant [6].

Pregnant women and infants are more at risk of morbidity and mortality from influenza than the general population [3–5,12,13,14]. Between 2009 and 2012 influenza caused one out of 11 maternal deaths [14]. Influenza in pregnant women can also have an impact on the growth and development of the foetus [4] and delivery complications, such as low birth weight and premature birth [14]. Infants under six months old are more at risk of severe complications and mortality from contracting the influenza virus [15]. Infants in England are unable to receive the flu vaccination until they are six months old and only if they are in a clinical risk group, or ages two to seventeen years old otherwise [6].

### 1.1. Vaccination rates in England

Pertussis vaccination coverage in pregnancy in England has recently been increasing. Latest figures from Public Health England (PHE) indicate that 73.8 per cent of women were vaccinated in pregnancy between January and March 2017 [15]. However, previous years saw a dip in vaccination rates during the summer months. PHE have hypothesised that this is due to an increase in pertussis vaccination during flu season when influenza vaccination is also being promoted.

Despite improvements in pertussis vaccination uptake in pregnancy, there have been 18 infant deaths related to pertussis in England since the programme began in 2012 [16]. For 16 of these deaths, the mother had not been vaccinated against pertussis during her pregnancy and for the other two infant deaths, the vaccination was administered too close to delivery to effectively protect the new born child [16]. Vaccination uptake also differs across regions in England, with some areas reporting lower uptake than others.

Influenza vaccination rates during pregnancy in England were 44.9 per cent in 2016/17 season [17]. While this has increased from 42.3 per cent in the previous year (2015/16) [17] it compares unfavourably to uptake of influenza vaccination in 65 year olds (70.5%, 2016/17) [17] and other countries in the UK (for example, Scotland 61.5%, 2016/17) [18].

Caution should be taken when interpreting these pregnancy vaccination rates as data collection can be difficult due to the complexities of recording pregnancy and non-pregnancy accurately and in a timely manner on electronic health records [16].

### 1.2. Current research on determinants of vaccination uptake in pregnancy

Only a small portion of existing published research on determinants of vaccination uptake relates to vaccination in pregnancy [19,20]. Wilson et al. [19] conducted a literature review, which specifically focused on vaccine hesitancy in pregnancy. This paper found that the main factors reported to contribute to vaccine hesitancy were [19]:

- Concerns about the safety of vaccination in pregnancy
- Low knowledge about vaccine efficacy, the diseases and availability of vaccine
- A healthcare worker not recommending the vaccination

It is important to understand the factors that influence the decision to receive a vaccination to support the development of strategies and interventions to increase coverage of vaccination in pregnancy. While Wilson et al.'s [19] review provides insight into the reasons pregnant women may be hesitant to receive a vaccination, it does not analyse the strategies that could help to increase uptake.

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